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**AN ECONOMIC STUDY OF TOMATO PRODUCTION IN
CHEROKEE COUNTY, TEXAS**



**RASTUS JAMES MORELAND
1959**

AN ECONOMIC STUDY OF TOMATO
PRODUCTION IN CHEROKEE COUNTY, TEXAS

A Thesis
Presented to
the Graduate Division
Prairie View Agricultural and Mechanical College

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

by
Rastus James Moreland
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AN ECONOMIC STUDY OF TOMATO PRODUCTION IN
CHEROKEE COUNTY, TEXAS

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Acknowledgement

This thesis has been written to meet two major objectives:

1. Satisfy requirements.
2. Aid the writer in his attempt to improve the economic conditions of the tomato farmer.

For special encouragement, guidance and criticism, the writer acknowledges with thanks the help of Dr. John M. Coruthers, Professor of Agricultural Economics, Prairie View A. and M. College, Prairie View, Texas.

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Chapter I

Introduction

Fresh green-wrap tomatoes were the leading vegetable crop in East Texas until 1952, with an annual value of approximately 12 million dollars.

The Texas tomato industry started about 1890 near Jacksonville, Cherokee County, in East Texas and has expanded to practically all vegetable-growing sections of the state. The industry is largely a spring enterprise which is divided into the early spring crop in the Rio Grande Valley and a late spring crop in East Texas. There is some fall tomato production in the state. The tomato areas supplement each other and give Texas almost a year-round tomato production season.

The main problems of tomato production in Texas are: the low price paid to farmers, and the poor quality of tomatoes. The low prices and poor quality are related. Because of the low prices received by farmers, quality is often neglected for volume. An increase in poor quality tomatoes reduces terminal¹ prices and the demand for East Texas tomatoes.

1

Marketing Green-Wrap Tomatoes, Texas Agriculture Experiment Station, College Station, Texas, Bulletin 861, May, 1957, p. 3.

The tomato industry in Cherokee County has decreased considerably in the last few years. Many farmers have dropped them completely, others have cut production in half, and still others grow an acre or two as a side-line while holding some other public job. They contend that producing tomatoes purely as a cash crop does not pay to sell as green-wrap and there are extremely low prices received for ripe tomatoes.

The tomato is the leading commercial green-house vegetable crop. Tomatoes may be grown in plant houses for maturing early crops of quick growing vegetables. A fall crop may be grown but yields are low under the short days of autumn. Culture of tomatoes in mid-winter is difficult and costly.

The tomato is one of the most flexible of vegetable plants. It responds readily to a wide variety of conditions, lagging in growth but still surviving under drought or starvation, only to respond speedily when its needs are supplied. It leaves and stems readily reflect, in color and form, symptoms of various deficiencies. It may be grown on peat or mineral soil, on quartz sand or in culture solution. The tomato rivals the potato, or perhaps exceeds it, as a subject of research, not only for its own sake but as a "guinea pig" to yield new knowledge to be applied to plants in general.

Food use of the tomato began early in its history, but until about a hundred years ago, some thought it actually poisonous or disposing to cancer. It was not until about 1830 that it found a place in our markets.²

Although water composes about 94.1% of the tomato as you can see by glancing at Table I, it contains other valuable food nutrients. The tomato is an excellent food for salads and is very good for decorative purposes.

2

Paul Work, Vegetable Production and Marketing.
New York: John Wiley and Sons, Inc., pp. 342, 343, 347.

Table I

Edible Portion of the Tomato

Constituents	Per cent
Water	94.1
Protein	1.0
Total carbohydrates	4.0
Ash	.57
Calcium	.001
Fiber	.6
Sugar	3.4
Fat	0.3
Starch	none
Iron	.0006

Purpose of Study

Since tomato production has declined from the once highly specialized industry marked by narrow margins of profits, the writer would like to know what economic practices can tomato producers follow in order to increase larger returns from tomatoes.

To acquaint tomato producers with techniques and practices that can increase production and profit.

Statement of Problem

The problem of this study is to determine if farmers are using bad farming practices or producing tomatoes that are not suited to their climate, consequently causing a low price and poor market.

Scope of Study

This study is limited to 57 farmers of Cherokee County, Texas, who grow tomatoes commercially.

Method of Securing Data

The data for this study were obtained from three sources:

1. Questionnaire responses from the farmers who constituted the population of this area.
2. Interviews of all county agricultural extension workers.
3. Documentary materials from a review of related literature.

Chapter II

History of Cherokee County

Cherokee County has approximately 671,360 acres with a valuation of \$26,000,000 in 1955 taxation purposes. It was organized July 13, 1846, and was named for the Cherokee Indians. The county seat was named for John Rusk who practiced law in the county from 1829 until 1856.

Timber development started in the early 1880's. Chronister and Pine Lumber Companies still have large holdings in the county, but do not now operate mills. Thirteen other mills of various sizes, handling hard and soft wood do operate.

The vegetable industry started around New Summerfield and Ponta in 1912. Sweet potatoes, cabbage, peppers, eggplants, onions, and tomatoes are shipped by rail and truck to all sections of the United States. The county produces much corn, grain, southern peas, sorghum, sweet and Irish potatoes, hay, watermelon, cantaloupes and pepper. Once one of the leading Texas counties in diversified farming, Cherokee County is now tending toward more specialization and larger units even on diversified farms. The county has become a major shipping center for broilers, eggs, milk, fruits, vegetables and beef cattle.

The Texas Agriculture Extension Service has maintained agents in Cherokee County since it was established in 1914. Six white and two Negro extension agents are now serving the needs of farmers, ranchmen and homemakers in the county. The county was selected by the state and federal officials in 1955 as the pilot county in the Rural Development Program in Texas. Agriculture agencies having local representatives in the community include the Farmers Home Administration, Soil Conservation Service, Rural Electrical Association and the Texas Forest Service.

Cherokee County is located in the Central East Texas Timber Country. It is bordered on the west by the Neches River, on the north by Smith County, on the upper east by Rusk County, on the lower east half by the Angelina River and on the south by Angelina County. The county is 30 miles across on the north end, 62 miles north and south, and 16 miles across on the south end. The climate is comparable with that of the rest of East Texas, being fairly humid and warm most of the year. Annual rainfall averages about 42 inches. Five major groups of upland soils and four groups of bottom land soils occur in this area.

The 38,694 people in the county in 1950 resided in rural communities. Negroes comprise about 25 percent of the farm population. Twenty towns and communities are served by five railroad lines. The county is crisscrossed by seven state and federally maintained highways. Two telephone companies serve the county; also two radio stations.

The major industries and other sources of income in the county are lumbering, basket and crate manufacturing, wood plastics, garment factories, construction, toy pistol manufacturing, and employment in the construction of a large dam for municipal and industrial water supplies. The trend of farming for the county has turned toward part-time farm employment.³

³
Texas Almanac. Dallas: A. H. Belo Corporation, 1958-59, pp. 541-542.

Chapter III

Production Data

Varieties

The bulk of tomatoes grown in East Texas are for the green-wrap commercial purpose. These tomatoes must have certain definite characteristics to qualify for this purpose. Many varieties can be grown in East Texas but some are unsuited for transporting long distances, others can be transported long distances but are not so resistant to diseases or they mature too late for the East Texas market. Under no conditions is there a variety that does not have any of these defects but some are less susceptible than others.

Tests of a number of varieties by the Texas Experiment Station has found that Pritchard, Stokesdale, Rutgers and Marglobe are the best commercial varieties for Cherokee County. Cherokee County farmers are using these varieties as a check of Table II will show. Rutgers, Stokesdale and Marglobe comprised the largest percentage of tomatoes grown by farmers studied, with lesser varieties making up the remainder.

Most farmers indicated that they get information concerning varieties from the Texas Experiment Station, others were urged to use these varieties by the agriculture teacher and county agent.

A new variety that is being experimented with in Cherokee County is the Hotset. The seed of this variety is not in sufficient quantity to supply farmers yet, but should be by next planting season. This variety is highly resistant to hot dry weather and should be an excellent variety for Cherokee County.

The Hotset tomato was developed to provide fruit for an additional market season in East Texas from August to October. Research was started in 1947 to develop a tomato variety that would set fruits in warmer weather and produce marketable fruits of green-wrap type for local marketing in late summer and early fall. Hotset is the first variety to result from this project.⁴

4

Hotset, Texas Agriculture Experiment Station,
January, 1959, Bul. No. 376, p. 2.

Table II

Tomato Varieties Grown In
Cherokee County, 1958

Variety	No. growing	Per cent
Prictchard	1	1.7
Stokesdale	17	29.8
Rutgers	21	36.8
Marglobe	7	12.2
Break O'Day	1	1.7
Homestead	5	8.8
Homestead 24	3	5.2
Campbell 135	2	3.5

Hotbeds

The main use for hotbeds is for starting plants to be grown in the field, although they are used to some extent to grow crops to maturity out of the normal growing season.

The main considerations in locating hotbeds are: (1) nearness to the farm buildings so that they can be cared for with the least trouble; (2) proximity to a good water supply; and, (3) protection from the cold winds by locating them on the south or southeast side of a hill, on the protected side of buildings, or by means of windbreaks, board fences, or walls.

Southern or southeastern exposures are preferable because beds will get more sunshine with these exposures than with others. Where there is more than one row of frames, they should be parallel to each other, with ample spaces between rows for handling the mats and sashes.

The frame may be made of wood, cement, brick, or stone, the first two materials being most common. Where wood is used in making a permanent hotbed two by four inch lumber is used for the posts. These posts are driven into the ground at the corners of the

hotbed and at intervals of four to six feet along the sides of the bed. Boards or planks are nailed to these posts. The frame may or may not extend to the bottom of the pit, but in any case it should extend 12 to 18 inches above the surface of the ground on the back side (usually north side) and 6 to 12 inches on the front, thus affording a slope preferably to the south. Every three feet a crossbar or slide should be placed for the sash to rest upon. In all permanent hotbeds durable wood should be used. Cedar, locust, or chestnut for the posts and cypress or chestnut for the frame are satisfactory.

The ordinary hotbed covered with sash needs some protection during cold weather. It is necessary to cover the beds every cold night and sometimes during the entire day in early spring. Old matting, carpets or heavy burlap may be used, but most tomato farmers use straw mats. They are relatively inexpensive and easy to make.⁵

Hotbeds under most conditions need heat other than that available from the sun. This may be by the fermentation of horse manure, by hot air flues or by electricity. The heated bed may be used to start

⁵Homer C. Thompson, Vegetable Crops. New York: McGraw-Hill Book Company, Inc., 1957, pp. 88-89.

plants much earlier than would be possible in the cold frame, and for that reason is almost indispensable to the tomato farmer unless he has a small greenhouse.

The manure-heated hotbed is the most easily and quickly started by placing a sash-covered cold frame on top of a flat pile of fermenting horse manure. The pile should be at least one foot larger all around than the frame, and manure pulled up around the sides of the frame. The depth of the pile will depend on the length of time that heat is desired. Within the frame four to six inches of well prepared soil is placed. The temperature of the soil may rise to 130°F. or above. If seed were planted before the soil cooled to 90° or 85°F. the vitality would be destroyed. To be safe on this question every hotbed user should have a soil thermometer.

Many growers use concrete, brick or stone in order to avoid the constant care and replacing of rotten wood in the permanent hotbed pit. The initial expense is of course great. Money is saved in the long run.

A supply of fresh manure from well fed horses should be piled near by seven to ten days before the bed is to be made. It should contain about one-third straw.

A six-inch layer is forked in and well tramped especially at the sides and corners. This process is repeated until the pit is filled to within six to ten inches of the top.

The soil may be put in, the sash placed and bed allowed to heat.

Beds heated with hot air known as flue-heated beds, are common in some sections where plenty of cord wood is available. The flue-heated hotbed requires care in the location of the fire box where a smoldering coal or wood fire is to furnish the heat. The hot air and smoke pass up through two vitrified pipes. The fumes escape through the tile tubes and circulate in an open space below the board floor upon which the soil rests or go directly to the chimneys. Satisfactory results can be obtained from this type of heating but the bed will tend to dry out to a greater extent.

The electrically-heated hot bed must be tightly constructed to conserve heat. The sides and ends should be baked with sand, cinders or other insulating material. Usually six to eight inches of cinders or sand are used for insulation and drainage under the bed. A special soil-heating cable is laid on the sand and five inches of good soil placed above it.

A thermostat is necessary to control the current and maintain an uniform temperature. A 60 foot lead-covered cable with 400 watt capacity on a 110 volt circuit will heat a 6 by 6 foot area in almost all climates, and more than this where temperatures are not so severe. Rubber covered cables can be used for soil heating.

Beds equipped for electrical heating have several advantages. They are ready for use when needed, can be used for two crops of plants with little additional labor for preparations, the temperature is automatically controlled, and the cost of operation is not great where a low rate for electricity is available.⁶

There were only two electrically-heated hotbeds represented in the county in which this study was made. Reasons given were that they were too expensive to put into operation or the electric power was not available to the farmers.

The most common types of hotbeds used were the flue heated and manure-heated. The manure-heated hotbeds were the most commonly used comprising 70.1 per cent. The flue-heated hotbeds comprised 26.3 per cent and the electrically heated only 3.5 per cent.

⁶James Edward Knott, Vegetable Growing. Philadelphia: Lea and Febiger Publishers, 1959, pp. 36-37.

Cold Frames

Cold frames are like hotbeds in most respects, the only primary difference being that they do not require artificial heat. The main source of heat is direct sunlight. Cold frames are used to receive transplants of seedlings that are too young and tender to be placed in the open field.

Because the sun is usually the sole source of heat they should be located where they will be sheltered from the cold winds or erect windbreaks for that purpose. Very large quantities of water will be required during the warm breezy days, therefore, it is important that cold frames should be located near a good source of water. Water should be under pressure with sufficient outlets for spraying from a hose. The cold frame also should be located near the planting field so that plants will not have to be carried a long ways.

The frames may be built somewhat as indicated for hotbeds, but the structure is placed entirely on the surface of the level ground and no excavation is required. The height of the sides or the depth of the frame, must be determined by the size of the plants to be grown. Ordinarily, a 12-inch board or plant is high enough for the north side and an 8-inch piece for the south side.⁷

⁷Ralph L. Watts, The Vegetable Growing Business. New York: Orange Judd Publishing Company, 1947, p. 40.

Tomato farmers in Cherokee County kept plants in cold frames from two to eight weeks with the average being three to four weeks. The length of time plants are kept in cold frames depends upon the weather conditions. With proper care healthy plants can usually be produced in three and one-half to four weeks. However, when weather conditions are unfavorable they are kept for longer periods.

Where protection against light frosts is wanted during the night, muslin or burlap treated with paraffin or linseed oil will be found satisfactory. These textiles may be fastened at the high side of the frame and rolled up during the day.⁸

Protection for cold frames in this study were white muslin sheets. These sheets protect the young plants from the cool spring nights and also let sunlight in on the plants during the day.

Cultivation

Fields usually do not produce profitable crops of tomatoes unless they are practically free from disease-causing organisms that damage the roots and stems. Fertility is added by plowing humus into the

soil and applying commercial fertilizers. The soil must be well drained.

A field ready for the plants from the cold frame is prepared as follows: plow the field early (preferably in December) mixing as much plant material as possible into the soil. Early plowing controls cut worms by starving them. About March 15, the rows six to nine feet apart are opened with a middle buster and 400 pounds of 5-10-5 fertilizer per acre is mixed in the furrows. Two turning plow furrows are used to cover the fertilizer. The fertilizer should be applied a week to 10 days before transplanting. If the soil is wet and the wind is damp, several rows may be opened at one time for transplanting tomatoes, but if the soil is too dry, open only about two rows at one time as the soil dries seriously within 30 minutes. For opening tomato rows it is customary to use a Georgia stock with a nine inch shovel plow and a block of wood about six inches in diameter chained to the heel to block the furrow open.

Profitable yields of fruits are most likely to result when field culture begins with healthy, stocky plants six to eight inches tall. Sprinkle plants in the cold frame until the soil is very wet before

taking them up. Lift 9 to 12 plants in a three-inch layer of soil with a wide shovel or coat seed fork. Place plants on the smooth boards of a slide or low wagon, and sprinkle until they are dripping wet. Plenty of water will help them live through dry soil and wind in fields and to continue growing immediately.

Set the plants about 18 inches apart in the furrows. It is very important to pack the soil firmly around the ball of wet soil of every plant in an effort to connect the water in it with moist soil of the field. Hands are used to close the furrow between the tomato plants as this makes immediate cultivation of the field unnecessary.

When a soil crust forms following a rain an 18-inch sweep blade on a Georgia stock is used to break the soil crust and control weeds. The plow point is run about 10 inches from the rows for the first cultivation and increasingly farther away for the later ones. Sweep blades 30 to 36 inches wide are used for cultivating the middles late in May and June. Only sweep cultivation is desirable in fields that do not become boggy. Narrow sweep blades are used to open shallow furrows for side-dressing fertilizer and to cover the fertilizer.

Because many fields may become boggy and drown the tomato roots after heavy rains, most farmers use turning plows for cultivating tomatoes. Start such deep cultivation early enough to avoid cutting the tomato roots. Cultivating plows that turn furrows 10 to 12 inches wide are drawn about 12 inches from both sides of each row to build a two furrow bed and cover most of the weeds. The two furrow bed is made preferably two to three weeks after transplanting the tomatoes.

Side-dressing fertilizer: About 300 pounds of 8-8-8 fertilizer per acre is mixed with the soil in the bottoms of turning plow furrows on both sides of the bed. The fertilizer is covered by completing four-furrow beds. The job of making four-furrow beds with the first side-dressing can usually be done in one day. These beds are broad enough to avoid serious drought injury and the ditches help to protect the roots from excess rain. About 10 days later, the second side-dressing of 300 pounds of 8-8-8 fertilizer per acre is mixed in the turn plow furrow and is covered by completing six furrow beds. If the soil becomes packed by excessive rain, the sides of the beds can be loosened with sweep blades to give the roots air. Side-dressing fertilizer should be

applied only when the soil is moist or wet. Putting fertilizer near tomato roots in dry soil usually causes yellowing of leaves and shedding of flowers.⁹

The average tomato farmer reported cultivating tomatoes from three to four times depending on the amount of rainfall and weed growth. In most instances prescribed cultivating methods were used.

Fertilizer used varied among the farmers studied, it varied from 500 to 1500 pounds per acre with the average being 800 to 1000 pounds. These variations were due to difference in soil, and amount of rainfall.

Irrigation was used on only one farm. This practice proved very profitable for the particular farmer although cost of operation was increased considerably.

Pruning was done on an average of three times by each farmer, starting usually after the first two weeks in the field. The purpose of pruning is to increase the size of the earliest fruits. Prunes are the branches that grow from the stems at the base of the leaves. These prunes take necessary food needed for fruit growth.

Pest Control

Pest control in tomato production begins with selecting the ground for hotbeds, cold frames, and the planting of fields.

Pests of tomato roots and stems are: (1) root-knot nematodes, (2) fungus, (3) white mold, and (4) bacterium *solanacearum*. To avoid root diseases in the soil the farmers studied used a good system of crop rotation. Sorghum appears to be the best crop for controlling all four of the above parasites.

Diseases of the tomato proper reported were the tomato blights, late blight, early blight and leaf spot. Leaf mold and blossom end rot are other common diseases according to farmers in this study.

Most of these diseases can be controlled by the use of a metallic carbonate, such as zerkote (two pounds per 100 gallon of water), spray, or dusting with some copper dust.

Insects of the tomato above the ground that farmers were bothered with were tomato fruit worms, horn worms, potato beetles and stink bugs. The tomato fruit worm eats deep holes in the tomato fruits. It occurs all over the United States, and does more damage to tomatoes than any other insect.

The insecticides DDT, TDE, and cryolite are effective controls against the tomato fruit worm on tomatoes. DDT or TDE can be applied as a dust or a spray. Three applications at two week intervals should control this insect.¹⁰ Control measures for the other above insects are two and one-half pounds of arsenical, five pounds of hydrated lime to 50 gallons of water for spraying; one pound of arsenical and two pounds of hydrated lime for dusting.¹¹

Farmers reportedly chose dusting to spraying four to one because home-made devices could be used in dusting, whereas spray machines had to be purchased, thus increasing the cost of production. Spraying proved to be the most effective because the spray stays on plants longer than dust, thus giving longer protection. Most farmers reported using one or more of the control measures at least twice. A small per cent used both spray and dust for pest control.

10

The Tomato Fruitworm, How to Control It,
U. S. Department of Agriculture, May, 1958, Leaflet No. 367,
p. 2.

11

Watts, op. cit., p. 290.

Chapter IV

Financing Production

Financing tomato production is not as simple as it was several years ago when the tomato deal was at its best. However, tomatoes are still being grown and financed.

Most farmers indicated they borrowed money from merchants, fertilizer companies, and private individuals. Private merchants and fertilizer companies comprised most of the above three.

The loan is usually secured the first of the year so that the farmer can begin his operations as early as possible. Private merchant and individual loans are usually in the form of cash, whereas fertilizer companies' loans are in the form of fertilizer itself, with the understanding that cash will be repaid.

The amount of the loan depends upon the number of acres of tomatoes a farmer wishes to grow. The cost of producing an acre of tomatoes in Cherokee County varies from \$100 to \$200, including labor. To finance this cost a farmer makes his loan with the notes payable in June or July after the sale of his tomatoes. Sometimes if other crops are grown along

with the tomato crop, a note is paid in June and another in October or November. This is done in case the tomato crop is not too good, as has been the case in the last few years.

Where fertilizer is used as a loan to farmers the note is usually due in June or July as the tomato crop is sold.

In most cases such items as farm trucks, cattle, farm implements and even the farm itself are mortgaged until the loan is paid. These items are mortgaged as security with the understanding that they will be taken if the loan is not paid.

Sometimes loans are made on a "character basis," that is they are made to individuals the lender has known for a long while or has done business with and was found to be honest, reliable and dependable in other, or similar transactions. These loans are usually confined to farmers who borrow from private merchants and individuals.

The smallest percentage of loans made by tomato farmers in Cherokee County, but the most important, is bank financed loans. These loans are low interest loans and like the other loans payable when farmers

sell their tomatoes. However, in recent years they have arranged notes to be payable in June, October and November. In this case other cash crops help repay the loans.

Where banks finance crop loans they finance up to 98% of the cost of production. They too require collateral for mortgage in case the loan is not repaid. Most bankers contacted revealed that they would rather farmers grow other cash crops than tomatoes to insure payment of loans.

The security required for loans is best described by Norton: ¹²

"If security is required this should normally include the liquidating or primary collateral and sufficient additional collateral to insure payment in case the operation being financed does not work out satisfactorily. This makes payment automatic if the operation is unsuccessful for proceeds of sale of mortgaged property belong to the lender. In some cases the liquidating collateral is quite intangible-- as for example, crops to be planted and then additional collateral is absolutely essential. In other cases it is tangible, for example, feeder cattle or lambs. Here the amount of additional collateral may be reduced or it may not be needed. The security taken should be adequate to cover all advances which may need be made during the life of the loan."

¹²
L. J. Norton, Financing Agriculture. Danville:
The Interstate, 1938, p. 151.

Chapter V

Marketing The Harvested Crop

In the production of tomatoes paramount in the mind of the farmer is the monetary benefits he will receive from his crop. Therefore, having carefully executed the responsibility of deciding which variety to plant, cultural and fertilization practices to follow, one must then select which marketing system to use in disposing of them.

Green-wrap Tomatoes

The stage of maturity at which tomatoes are picked depends upon the purpose for which they are grown and the distance they are to be transported. The length of time from seedlings to edible maturity is from 60 to 100 days depending on variety.¹³

Immature-green tomatoes may have not reached full size and are usually tough, leathery, and of poor color when ripened artificially. The green mature tomatoes (the type harvested primarily in this study), are considered ready for harvest when a jelly-like substance has developed around the seeds; and the color has begun to change to a light green color, especially at the blossom end.

¹³Henry T. Northern, The Secret of the Green Thumb. New York: The Ronald Press Company, 1954, p. 60.

At the beginning of the season, picking is done once each week and as the season advances, picking every four or five days may be necessary. In picking, grasp the tomato in the hand with the thumb or forefinger pressing against the stem, and separate by a half-turn or twist.

More than 90 per cent of the farmers indicated they used bushel baskets to harvest and handle their tomatoes, while less than 10 per cent used boxes, and still less than five per cent used tubs. A one-bushel size wooden field box 15½"x13"x22" is considered more desirable than the bushel basket because less damage is done to the fruit.¹⁴ Regardless of the type of container used, care should be exercised to protect the fruit from bruises, cuts, abrasions, sun and wind.

Most farmers in this study indicated that they use some type of liner in the containers which they believe reduces the losses of tomatoes, and after having picked the tomatoes set them in the shade with a cloth over them for protection from sun scald. Supporting the acts of basket lining was a study by Sorensen. In his 1951-56 study of tomatoes it was indicated that in 1951 only 11.4% of the farmers

¹⁴Rosborough, op. cit., p. 17.

used liners in their containers, and as a result of being told that some type of liner would help reduce losses, 41.0% of the farmers used some type of liner in 1952. Thus, reducing the amount of culls by two per cent.¹⁵

The hauling of tomatoes in bulk from fields to packinghouses in beds of trucks or trailers, as is done in some districts of Texas, is not regarded as good practice. It may be labor saving, but tomatoes so handled are subject to more or less rough treatment in loading and unloading. The bruising that results, although it may escape scrutiny of the sorters, seriously injures the appearance of the tomatoes after they have ripened, and final returns for the tomatoes may offset labor-saving costs in this method of handling.¹⁶

With the drop in tomato production in East Texas, Cherokee County farmers indicated that they are using greater care in the loading and stacking of tomatoes so most of them will reach the market in good condition. In order to do this tomatoes are stacked in straight rows side by side, and wooden planks about one by six inches are used to separate layers of baskets on top of

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Marketing Texas Green-wrap Tomatoes, Texas Agriculture Experiment Station, May, 1957, Bul. No. 861, p. 5.

16

Preparation of Fresh Tomatoes for Market, U. S. Department of Agriculture, Farmer's Bul. No. 1291, p. 12.

each other. However, not all of the farmers indicated that they follow this practice, although they do agree that such steps would reduce the amount of damage caused in hauling the tomatoes to the market.

Since green-wrap tomatoes are picked green and allowed to ripen in transit, they are not ordinarily shipped under refrigeration. They may be held at 0 to 3°C. for about a week without damage, but after longer periods at those temperatures they undergo a breakdown which results in failure to ripen normally and a tendency to acquire an insipid flavor.¹⁷

Table III shows the methods of obtaining information about the market centers as reported by Cherokee County tomato farmers.

Numerous forms of communication are used to give market news information to farmers regarding prices being paid at various markets. The telephone may be used to call buyers at the various shipping points. Yet fewer farmers use this mode of communication than any other. Daily market news reports are also available

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John C. Walker, Diseases of Vegetable Crops.
New York: McGraw-Hill Book Company, Inc., 1952, p. 426.

to the public. All radio stations have market reports and the farm editors generally give the range of prices paid the day before at the local shipping points. This is the form of communication used by the greatest percentage of Cherokee County farmers. Most local newspapers give a short report and range of prices for the day before in the area.

Talking to friends and neighbors, visiting the market the day before picking are other methods of finding out the best prices. The table will show that these two forms of communication were used 17.3 and 15.8 per cents respectively.

The primary advantage of using these various forms of communication is, of course, to select the best market for selling, and at which time. It is hoped that farmers will alter their usual trend of trading by giving themselves the opportunity to observe trading practices in, perhaps, different localities; noting the date when sale prices are most favorable so that picking and preparing for the market will be done at the most profitable periods.

Table III

Method of Obtaining Information About the
Tomato Market as Reported by Cherokee
County Farmers

Method	Percent Used
Telephone	3.5
Market News	21.0
Radio	29.8
Newspaper	12.2
Talking with neighbors	17.3
Shopping at various markets	15.8

Ripe Tomatoes

The bulk of ripe tomatoes in Cherokee County is sold to tomato canneries, a sale which may increase the profit from the crop, and a likely way to dispose of culls since canneries are located in nearby towns, e.g., Rusk, Alto, Jacksonville, and Maydelle. Tomatoes for canning should be picked when fully ripe, a factor of great importance in securing high quality of pack. If tomatoes are to be sold locally as ripe fruit, they should be picked every other day to prevent losses from over-ripening. Tomatoes for canning should be picked at the fully-ripe stage, since they are canned within 24 hours of delivery. In many areas, growers are paid according to grade. Generally, a tomato must show 90% of the surface well colored and be free from injury and disease to grade No. 1 for canning.¹⁸

About one-third of the farms in this study indicated that they sold culls to the cannery; the second one-third gave miscellaneous uses of culls, such as throwing them away, feeding to stock, and selling to truckers; and, the last one-third failed to answer. However, if tomatoes are sold to the cannery,

¹⁸James S. Shoemaker, Practical Horticulture. New York: John Wiley and Sons, Inc., 1955, p. 148.

the following account by Rosborough and others gives the usual trend of marketing by East Texas, Cherokee County, farmers.¹⁹

"... Because the No. 1 green tomatoes are usually too expensive for canneries to buy, they wait until the latter part of the green-deal shipping season at which time prices are low. Then many farmers haul their cull fruits home from the green-deal sheds and ripen them for the canneries. In ripening tomatoes for the cannery, spread the green fruits out in layers only 1-fruit deep on the floors of old buildings or in the shade of trees. It pays to discard decaying fruits nearly every day to prevent the parasites in them from decaying adjacent fruits also. All of the tomatoes of marketable size are picked from fields once or twice a week in July and August. The green and pink fruits are spread out in the shade to ripen while the red fruits are added to red fruits that have ripened in the shade for hauling to the canneries. Tomato fields commonly produce fruits that sell to canneries for \$25 or more per acre after the green-deal sheds close."

¹⁹
Rosborough, op. cit., p. 20.

Chapter VI

Profits Derived

During years when weather conditions are favorable and prices paid for green-wrap tomatoes are high, tomatoes are a very good cash crop. However, these conditions have not existed for the last two or three years. Being a perishable crop, and very highly so, farmers usually must sell tomatoes for whatever price they can get after they are produced.

Not connected with government subsidies, tomatoes are quick to respond to dictates of the market place. That is, prices are decided by local supply and demand.

Prices were anything but profitable during 1957 and 1958. They started off low and slid even lower. Growers either broke even or made nothing at all. Profits for most growers during these two years were unheard of.

The cost of producing green-wrap tomatoes in Cherokee County is about four cents per pound. Considering this fact, most farmers consider six or seven cents per pound for selling green-wrap tomatoes a fair price. Others contend that a flat 25% over the cost of production is an adequate price for their products. Neither has been the case in the past two years and either the per pound rate or the percent scale would be satisfactory to most of them in order to make some profit.

Table IV

Reasons Given by Cherokee County
Farmers for Low Prices

Reasons	Actual No.	Per Cent
1. Quality of Tomatoes	13	22.8
2. Quantity of Tomatoes	10	17.5
3. Earlier tomato production in other areas	26	45.6
4. Middlemen	1	1.7
5. All above reasons	3	5.2
6. No response	4	7.0

A green-wrap per pound scale of six cents and a farmer selling ripe tomatoes to local canneries can usually make a fair profit. Canneries are located near all farmers studied and are close enough so that they can sell their ripe tomatoes to them. The towns of Jacksonville, Rusk, Alto, and Maydelle have canneries that purchase ripe tomatoes from nearby farmers. These canneries usually pay from \$.75 to \$1.50 per bushel for ripe tomatoes. This gives a farmer some extra cash for his produce.

The ripe tomato deal usually lasts until the last bushel of tomatoes can be bought, ending about the middle of July.

Sometimes, in the case of green-wrap tomatoes, when farmers are anxious to sell tomatoes that have already been picked they sell to truckers. Farmers sell them for \$1.00 to \$1.50 per bushel depending upon what the truckers are willing to pay for them. This, however, is not a good policy because it helps to depress the market further and it does not give the farmer an adequate price for his tomatoes.

The 1959 tomato deal will be somewhat like the past two years as evidenced by the following excerpts from the Houston Post: Predicting opening prices for

tomatoes can be touchy business in any tomato deal. However, Jim Rosborough of Tyler, horticultural marketing specialist with the Texas Agricultural Extension Service, said he thinks East Texas will start at about five cents per pound. He said the area nearly always opens with a five cents feeler price. Then after several days the market seeks realistic levels according to supply and demand.

Rosborough estimated East Texas tomato acreage at about 2,500 acres down 50% from 1958. Bad prices are the causes.

The deal will be late. Significant movements are not expected before June 5-10. The Valley's crop will overlap East Texas a little but the Florida deal should be out by June 1. The specialist (Rosborough) cautioned against expecting any fancy prices because of low acreage. Arkansas, a new growing region, is on the tail end of the East Texas deal and the Valley is on the other end. These two influences will probably keep the market calm. Rosborough said there will be fewer buyers at East Texas than ever before. ²⁰

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The Houston Post, Sunday, May 17, 1959,
Section 2, p. 4.

Table V

Number car loads of tomatoes shipped from
Jacksonville, Texas by rail from 1940 to 1958*

Year	Number of cars shipped
1940	423
1941	364
1942	463
1943	505
1944	327
1945	504
1946	418
1947	375
1948	186
1949	271
1950	197
1951	236
1952-57**	
1958	1

*Information furnished by the Missouri-Pacific Railroad,
Jacksonville, Texas.

**No accurate record of car load shipment between 1952-1957.

Chapter VII

Summary and Conclusions

On the whole, these findings tend to support the hypothesis that low prices and poor market conditions have caused farmers to make less profit and cut production in the tomato industry. The once highly profitable crop that formerly gave farmers good returns on their investments has suddenly come to a standstill. Many farmers have ceased to produce tomatoes because of the above mentioned causes.

Since the tomato profits and production are declining it seems that some way should be devised to help the slumping industry.

The findings also appear to demonstrate that poor quality fruit is worthy of more attention than has been given to it in the past years. It was found also that poor quality fruit may be the reason or a contributor to low prices paid the farmer for tomatoes. It will take more intensive and more refined research to answer this question.

The data of this thesis do confirm two points:

(1) prices paid farmers are substantially too low and (2) production has decreased because of these low prices.

Chapter VIII

Recommendations

In view of the fact that tomato production and profits have declined in East Texas in the last few years, thus having a direct bearing on the farmer, the following recommendations are submitted:

1. Grow a tomato that will set fruit in hot dry weather.
2. Use irrigation where possible.
3. Produce only good quality tomatoes.
4. The farmers should organize with some national farm organization to help promote a sales campaign.
5. Continuous study by specialists in the field should be made.

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